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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,481	06/07/2005	Hidetsugu Goto	271245US0PCT	2273

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EXAMINER	
RAGHU, GANAPATHIRAM	
ART UNIT	**PAPER NUMBER**
1652	

DATE MAILED: 12/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/538,481	GOTO, HIDETSUGU	
	Examiner	Art Unit	
	Ganapathirama Raghu	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/07, 09/07, 12/02/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-7 are pending are pending in this application and are now under consideration for examination.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). This application is a 371 PCT/JP03/15542 filed on 12/04/2003 and claims the priority date of Japanese application 2002-356844 filed on 12/09/2002. However, examiner notes that the English translation for the Japanese application is not provided.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 06/07/05, 09/07/05 and 12/02/05 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner has considered the IDS.

Drawings

The drawings submitted on 06/07/2005 along with the Application NO: 10/538,481, are accepted for examination purposes only.

Claim Objections

Claim 1 is objected, due to the following informality: The following claim contains abbreviation GCS in the claim. Examiner suggests at least in the first recitation of the abbreviation, expanding them to recite the full forms of what the abbreviation stands for. Appropriate correction is required.

Claim Rejections 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 1 is rejected under 35 U.S.C. 101 because the claim could read on a non-statutory subject matter. The claims are drawn to 'A protein', which could read on product of nature. Claim directed to such matter is considered non-statutory. Examiner suggests amending the claim to recite 'An isolated protein' to show the hand of man and in order to overcome the rejection.

Claims 2 and 3 are rejected under 35 U.S.C. 101 because the claim could read on a non-statutory subject matter. The claims are drawn to '... DNA of a gene', which could read on product of nature. Claims directed to such matter are considered non-statutory. Examiner suggests amending the claim to recite 'An isolated DNA of the gene' to show the hand of man and in order to overcome the rejection.

Claim Rejections: 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2 and claims 3-7 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-2 recite the phrase "...an amino acid

sequence..." (lines 2, 4 and 5 of claim 1 and lines 3, 5 and 6 of claim 2), as the metes and bounds are not clear to the examiner. It is not clear whether the claims encompass the full-length sequence of SEQ ID NO: 2 or any portion or fragments of SEQ ID NO: 2. In order for the full-length of the polypeptides to be encompassed in said sequences, examiner suggests amending the claims to read as "...the amino acid sequence...". Clarification and correction is required.

Claims 1-2 and claims 3-7 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-2 recites the phrase "...inversion". It is not clear what is an "inversion" of amino acid is? Clarification is required.

Claims 1-3 and claims 4-7 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-3 recites the phrase "...as shown in SEQ ID NO:..". It is not clear to the Examiner as to what this phrase means in the context of the above claims. It is not clear whether the isolated polypeptide or polynucleotide indeed actually has the sequence SEQ ID NO: 2 or SEQ ID NO: 1 respectively or whether SEQ ID NO: 2 or SEQ ID NO: 1 is a representative sequence of the isolated polypeptide or polynucleotide. Examiner suggests applicant to make a direct reference to the SEQ ID NO: 1 or SEQ ID NO: 2 such as "a polynucleotide sequence of SEQ ID NO: 1 or a polypeptide sequence of SEQ ID NO: 2". Correction is required.

Claims 1, 3 and 4 and claims 5-6 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 3 and 4 are rejected for the phrase "enhancing temperature tolerance". The scope or the metes and bounds of the term "enhancing" are not clear to the examiner. It is also not clear as to how much of an increase in temperature tolerance? or range of temperature tolerance of what? is considered by the applicant as enhanced. Clarification and correction is required.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3 recites the phrase "...a nucleotide sequence..." (lines 3and 5), as the metes and bounds are not clear to the examiner. It is not clear whether the claims encompass the full-length sequence of SEQ ID NO: 1 or any portion or fragments of SEQ ID NO: 1. In order for the full-length of the polynucleotide to be encompassed in said sequences, examiner suggests amending the claims to read as "...the nucleic acid sequence...". Clarification and correction is required.

Claim 3 is indefinite in the recitation of stringent conditions, as the specification does not define what conditions constitute "stringent". Perusal of the specification indicates there is no definition for the conditions which are intended to be stringent and in the art what is considered stringent varies widely depending on the individual situation as well as the person making the

determination. As such it is unclear how homologous to the sequence of a gene encoding SEQ ID NO: 1, a sequence must be to be included within the scope of these claims.

Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 recites the phrase "having alcohol oxidation ability among the microorganisms according to claim 4...". This phrase is confusing, does it include any microorganism of claim 4 or only certain ones? Clarification is required.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 7 recites "plasmid pUCGCS (FERM BP-8217) comprising at least the DNA according to claim 2". As such it is unclear if the claim is limited to the specific plasmid pUCGCS (FERM BP-8217) or includes any plasmid comprising any DNA of claim 2? Clarification is required. For further examination, Claim 7 is assumed to be limited to plasmid pUCGCS (FERM BP-8217).

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-2 and claims 3-6 depending therefrom are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a

way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1-6, are directed to a protein ceramide-glucosyl transferase (GCS) having an amino acid sequence of SEQ ID NO: 2 or an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and having a function of enhancing temperature tolerance, wherein said polypeptide is encoded by a polynucleotide sequence comprising the nucleotides 73-1251 of SEQ ID NO: 1 or a DNA that hybridizes with a probe under any stringent conditions to a nucleotide sequence consisting of the nucleotides 73-1251 of SEQ ID NO: 1 and encoding a polypeptide with ceramide-glucosyl transferase (GCS) activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotides, a microorganism comprising said polynucleotides and a method of producing vinegar by said microorganism. Claims 1-6 are rejected under this section 35 U.S.C. 112, because the claims are directed to a genus of polypeptides and encoding polynucleotides with no support in the specification for the structural details associated with the function i.e., GCS activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotides, a microorganism comprising said polynucleotides and a method of producing vinegar by said microorganism. The specification discloses the isolation of a polypeptide with SEQ ID NO: 2 encoded by a polynucleotide of SEQ ID NO: 1 comprising the nucleotide residues 73-1251 of SEQ ID NO: 1 with GCS activity and having a function of enhancing temperature tolerance, a recombinant plasmid comprising said polynucleotide, a microorganism comprising said polynucleotide and a method of producing vinegar by said microorganism. No

description of identifying characteristics of all of the sequences of an isolated protein with GCS activity and having a function of enhancing temperature tolerance, said protein having an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 with GCS activity and having a function of enhancing temperature tolerance, wherein said polypeptide is encoded by a polynucleotide sequence comprising the nucleotides 73-1251 of SEQ ID NO: 1 or a DNA that hybridizes with a probe under any stringent conditions to a nucleotide sequence consisting of the nucleotides 73-1251 of SEQ ID NO: 1 and encoding a polypeptide with GCS activity and having a function of enhancing temperature tolerance, a recombinant plasmid comprising said polynucleotides, a microorganism comprising said polynucleotides and a method of producing vinegar by said microorganism has been provided by the applicants, which would indicate that they had possession of the claimed genus of the polypeptides and encoding polynucleotides. Claim 3 is included in this rejection although 3 (a) describes the structure encoding a function, however part 3(b) DNA that hybridizes with a probe under any stringent conditions to a nucleotide sequence consisting of the nucleotides 73-1251 of SEQ ID NO: 1 or a part thereof and encoding a polypeptide with GCS activity, includes polynucleotides with only short regions of structural similarity to SEQ ID NO: 1, which regions have not been correlated to the recited function, such that the genus recited includes members highly variable in structure. Therefore, one skilled in the art cannot reasonably conclude that applicant had possession of the claimed invention at the time the instant application was filed. Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at www.uspto.gov.

Claims 1-6 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated of a polypeptide with SEQ ID NO: 2, encoded by a polynucleotide of SEQ ID NO: 1 comprising the nucleotide residues 73-1251 of SEQ ID NO: 1 said polypeptide with GCS activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotide, a microorganism comprising said polynucleotide and a method of producing vinegar by said microorganism, does not reasonably provide enablement for any protein ceramide-glucosyl transferase (GCS) having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and having a function of enhancing temperature tolerance, wherein said polypeptide is encoded by a polynucleotide sequence comprising the nucleotides 73-1251 of SEQ ID NO: 1 or a part thereof, or a DNA that hybridizes with a probe under any stringent conditions to a nucleotide sequence consisting of the nucleotides 73-1251 of SEQ ID NO: 1 and encoding a polypeptide with ceramide-glucosyl transferase (GCS) activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotides, a microorganism comprising said polynucleotides and a method of producing vinegar by said microorganism. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and or use the invention commensurate in scope with the claims.

Factors to be considered in determining whether undue experimentation is required are summarized in *In re Wands* (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988)) as follows: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the

prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claim(s).

Claims 1-6 are so broad as to encompass for any protein ceramide-glucosyl transferase (GCS) having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and having a function of enhancing temperature tolerance, wherein said polypeptide is encoded by a polynucleotide sequence comprising the nucleotides 73-1251 of SEQ ID NO: 1 or a part thereof, or a DNA that hybridizes with a probe under any stringent conditions to a nucleotide sequence consisting of the nucleotides 73-1251 of SEQ ID NO: 1 and encoding a polypeptide with ceramide-glucosyl transferase (GCS) activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotides, a microorganism comprising said polynucleotides and a method of producing vinegar by said microorganism. The scope of the claims are not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polypeptides and encoding polynucleotides broadly encompassed by the claims. Since the amino acid sequence of a protein encoded by a polynucleotide determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires knowledge and guidance with regard to which amino acids in the protein's sequence and the respective codons in its polynucleotide, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the encoded proteins' structure relates to its function. However, in this case the disclosure is limited to an isolated polypeptide with SEQ ID NO: 2, encoded by a polynucleotide of SEQ ID

NO: 1 comprising the nucleotide residues 73-1251 of SEQ ID NO: 1 said polypeptide with GCS activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotide, a microorganism comprising said polynucleotide and a method of producing vinegar by said microorganism, but provides no guidance with regard to the making of variants and mutants or with regard to other uses. In view of the great breadth of the claims, amount of experimentation required to make the claimed polypeptides and encoding polynucleotides, the lack of guidance, working examples, and unpredictability of the art in predicting function from a polypeptide primary structure (e.g., see Ngo et al. in The Protein Folding Problem and Tertiary Structure Prediction, 1994, Merz et al. (ed.), Birkhauser, Boston, MA, pp. 433 and 492-495), the claimed invention would require undue experimentation. As such, the specification fails to teach one of ordinary skill how to use the full scope of the polypeptides encompassed by this claim.

While enzyme isolation techniques, recombinant and mutagenesis techniques are known, and it is not routine in the art to screen for multiple substitutions or multiple modifications as encompassed by the instant claim, the specific amino acid positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions or deletions.

The specification does not support the broad scope of the claims which encompass all modifications of polypeptide with SEQ ID NO: 2 encoded by a polynucleotide comprising the

nucleotide residues 73-1251 of SEQ ID NO: 1 and with ceramide-glucosyl transferase (GCS) activity and having a function of enhancing temperature tolerance, recombinant plasmid comprising said polynucleotides, a microorganism comprising said polynucleotides and a method of producing vinegar by said microorganism, because the specification does not establish: (A) regions of the protein/polynucleotide structure which may be modified without affecting the activity of encoded ceramide-glucosyl transferase (GCS) activity and having a function of enhancing temperature tolerance; (B) the general tolerance of the polypeptide and the polynucleotide encoding ceramide-glucosyl transferase (GCS) activity and having a function of enhancing temperature tolerance to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any amino acid residue or the respective codon in the polynucleotide with an expectation of obtaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims broadly including polypeptides and encoding polynucleotides with an enormous number of modifications. The scope of the claims must bear a reasonable correlation with the scope of enablement (*In re Fisher*, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of polypeptides and encoding polynucleotides of ceramide-glucosyl transferase having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 7 recites a polypeptide encoded by a polynucleotide contained in a recombinant plasmid pUCGCS (FERM BP-8217).

It is apparent that plasmid pUCGCS (FERM BP-8217) is required to practice the claimed invention. As such the biological material must be readily available or obtainable by a repeatable method set forth in the specification, or otherwise readily available to the public. If it is not so obtainable or available, the requirements of 35 USC112, first paragraph, may be satisfied by a deposit of the plasmid pUCGCS (FERM BP-8217). The claimed plasmid sequences are not fully disclosed, nor have all sequences derived for their construction been shown publicly available. The specification does not disclose a repeatable method to obtain these vectors. Accordingly a deposit of these vectors should have been made. It is noted, there is no indication in the specification regarding the deposit or as to the public availability. If the deposit was made under the terms of Budapest Treaty, then a statement, affidavit or declaration by Applicants, or a statement by an attorney of record over his/her signature and registration number, or someone empowered to make such a statement, stating that the invention will be irrevocably and without restriction released to the public upon the issuance of a patent, would satisfy the deposit requirement made herein.

If the deposit was not been made under the Budapest Treaty, then in order to certify that the deposit meets the criteria set forth in 37 CFR 1.801-1.809 and MPEP 2402-2411.05, Applicant may provide assurance of compliance by statement, affidavit or declaration, or by

someone empowered to make same, or by a statement by an attorney of record over his /her signature and registration number showing that:

(a) during the pendency of the application, access to the invention will be afforded to the Commissioner upon request;

(b) all restrictions upon availability to the public will be irrevocably removed upon granting the patent;

(c) the deposit will be maintained in public depository for a period of 30 years, or 5 years after the last request or for the enforceable life of the patent, whichever is longer;

(d) a test of the viability of the biological material at the time of deposit (se 37 CFR 1.807); and the deposit will be replaced if it should ever become inviable.

Claim Rejections 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Leipelt et al., (JBC., 2001, Vol. 276 (36): 33621-33629) when given the broadest interpretation. Claims 1-2 are directed to any protein ceramide-glucosyl transferase (GCS) having an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and encoding gene or polynucleotides and said polypeptide with ceramide-glucosyl transferase (GCS) activity having a function of enhancing

temperature tolerance. Leipelt et al., (*supra*) have disclosed the isolation and identification glycosylceramide synthases (UDP-glucose:ceramide glucosyltranasferase) from many different species ranging from plant, nematode and a variety of fungi (entire document). The reference is silent regarding said polypeptide having a function of enhancing temperature tolerance, however glusoylceramide synthesis (carried out by said enzymes) and degradation are believed to contribute to control of the level of ceramide, which are regarded as a second messenger involved in many biological processes such as heat stress response and other stress response (Introduction section, page 33621). Since the claims are directed to any protein ceramide-glucosyl transferase (GCS) having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and encoding gene and said polypeptide with ceramide-glucosyl transferase (GCS) activity having a function of enhancing temperature tolerance. Examiner takes the position that the glycosylceramide synthases in said reference will comprise a gene or polynucleotide encoding a polypeptide having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 with ceramide-glucosyl transferase (GCS) activity and further having a function of enhancing temperature tolerance. Therefore the reference of Leipelt et al., anticipates the claims 1-2 of the present invention.

Since the Office does not have the facilities for examining and comparing applicants' protein with the protein of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed product and the product of the prior art (i.e., that the protein of the prior art does not possess the same material structural and functional

characteristics of the claimed protein). See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *In re Fitzgerald* et al., 205 USPQ 594.

Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Jorasch et al., (Eur. J. Biochem., 2000, Vol. 267: 3770-3783) when given the broadest interpretation. Claims 1-2 are directed to any protein ceramide-glucosyl transferase (GCS) having an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and encoding gene or polynucleotides and said polypeptide with ceramide-glucosyl transferase (GCS) activity having a function of enhancing temperature tolerance. Jorasch et al., (*supra*) have disclosed the isolation and identification novel processive and non-processive glycosyltransferases from bacteria and plant (entire document). The reference is silent regarding said polypeptide having a function of enhancing temperature tolerance, however glusoylceramide synthesis (carried out by said enzymes) and degradation are believed to contribute to control of the level of ceramide, which are regarded as a second messenger involved in many biological processes such as heat stress response and other stress response and therefore said enzymes inherently possess the property of enhancing thermotolerance. Since the claims are directed to any protein ceramide-glucosyl transferase (GCS) having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and encoding gene and said polypeptide with ceramide-glucosyl transferase (GCS) activity having a function of enhancing temperature tolerance. Examiner takes the position that the glycosyltransferases in said reference will comprise a gene or polynucleotide encoding a

polypeptide having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 with ceramide-glucosyl transferase (GCS) activity and further having a function of enhancing temperature tolerance. Therefore the reference of Jorasch et al., anticipates the claims 1-2 of the present invention.

Since the Office does not have the facilities for examining and comparing applicants' protein with the protein of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed product and the product of the prior art (i.e., that the protein of the prior art does not possess the same material structural and functional characteristics of the claimed protein). See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *In re Fitzgerald* et al., 205 USPQ 594.

Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Saito et al., (Arch. Biochem. Biophysics., 2002, Vol. 403: 171-178) when given the broadest interpretation. Claims 1-2 are directed to any protein ceramide-glucosyl transferase (GCS) having an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and encoding gene or polynucleotides and said polypeptide with ceramide-glucosyl transferase (GCS) activity having a function of enhancing temperature tolerance. Saito et al., (*supra*) have disclosed the isolation and identification novel processive and non-processive glycosyltransferases from bacteria and plant (entire document). The reference is silent regarding said polypeptide having a function of enhancing temperature tolerance, however glusoylceramide synthesis (carried out by said

enzymes) and degradation are believed to contribute to control of the level of ceramide, which are regarded as a second messenger involved in many biological processes such as heat stress response and other stress response and therefore said enzymes inherently possess the property of enhancing thermotolerance. Since the claims are directed to any protein ceramide-glucosyl transferase (GCS) having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 and encoding gene and said polypeptide with ceramide-glucosyl transferase (GCS) activity having a function of enhancing temperature tolerance. Examiner takes the position that the glycosyltransferases in said reference will comprise a gene or polynucleotide encoding a polypeptide having an amino an amino acid sequence comprising a substitution, deletion, insertion, addition or inversion of one or several amino acid to the amino acid sequence of SEQ ID NO: 2 with ceramide-glucosyl transferase (GCS) activity and further having a function of enhancing temperature tolerance. Therefore the reference of Saito et al., anticipates the claims 1-2 of the present invention.

Since the Office does not have the facilities for examining and comparing applicants' protein with the protein of the prior art, the burden is on the applicant to show a novel or unobvious difference between the claimed product and the product of the prior art (i.e., that the protein of the prior art does not possess the same material structural and functional characteristics of the claimed protein). See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *In re Fitzgerald* et al., 205 USPQ 594.

Conclusion

None of the claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ganapathirama Raghu whose telephone number is 571-272-4533. The examiner can normally be reached on 8 am - 4.30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy can be reached on 571-272-0928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of the application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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